



NORTHFORK POWERHOUSE LESSONS LEARNED

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GENERATION AUTOMATION**

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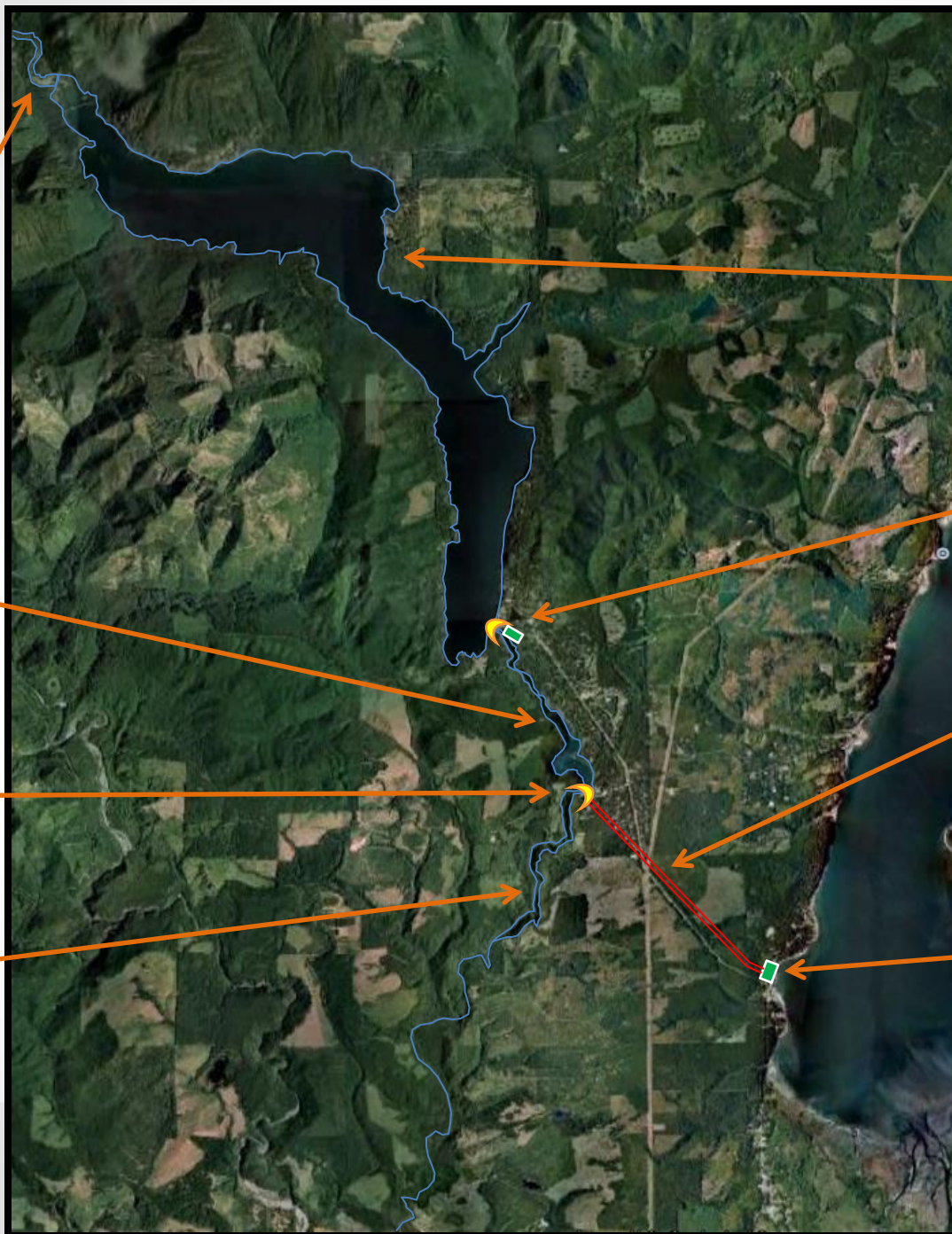
NORTHFORK LESSONS LEARNED

- **CUSHMAN HYDROPROJECT HISTORY**
- **LESSON LEARNED #1: PLANNING/DESIGN PHASE**
CONSIDER THE EXPERTS
- **LESSON LEARNED #2: INSTALLATION PHASE**
CONSIDER THE MOISTURE
- **LESSON LEARNED #3: OPERATIONS PHASE**
CONSIDER THE AUTOMATION
- **CONCLUSION/QUESTIONS**



CUSHMAN HYDROELECTRIC PROJECT





Lake Cushman

**No. 1 Dam and
Powerhouse**

**Power Tunnel
and Penstocks**

**Cushman No. 2
Powerhouse**



CUSHMAN #2 DAM HISTORY

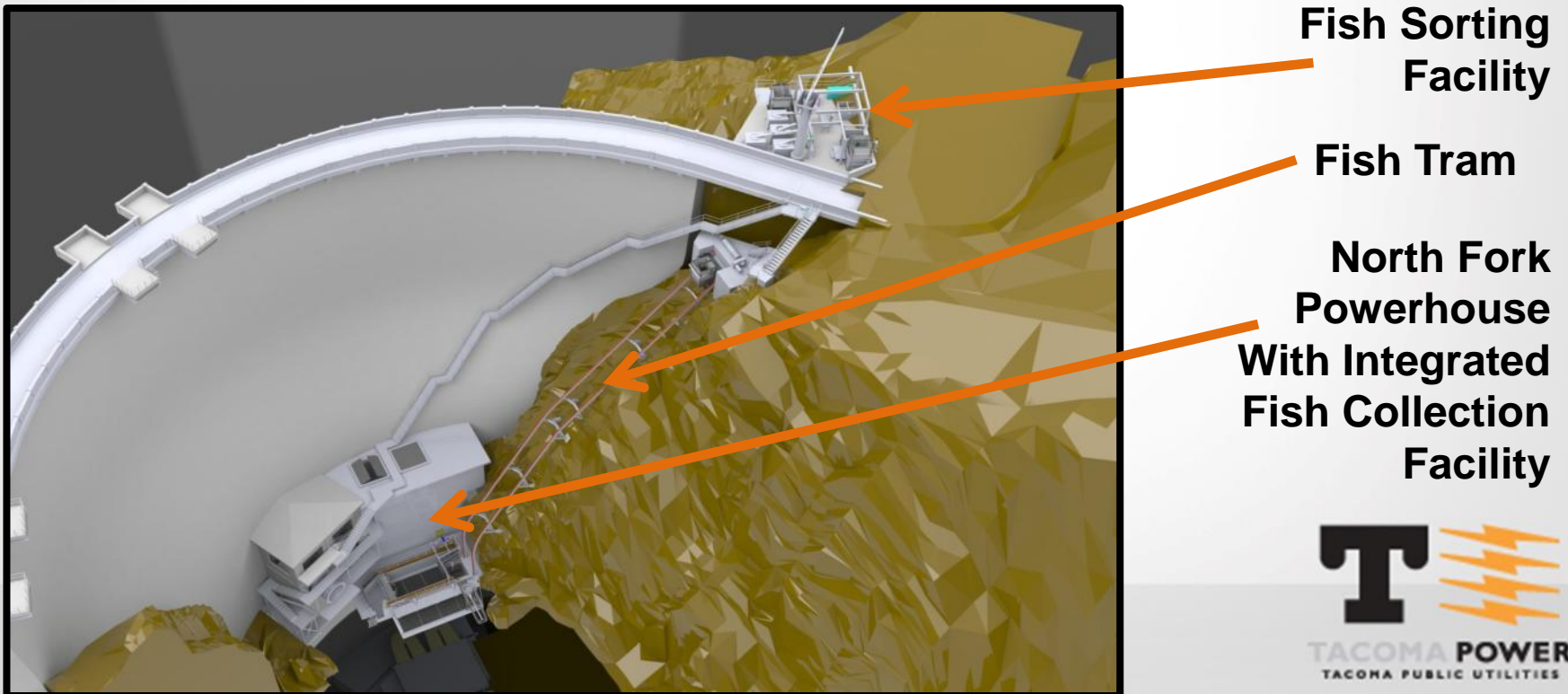


- Completed in 1930
- 175 feet tall
- 575 feet long
- Retains two-mile long Lake Kokanee



NORTHFORK SITE OVERVIEW

- The Fish Collection Facility provides fish passage over the Cushman No. 2 dam
- Includes two 1.8 MW turbine-generator units to pass the required flows into the North Fork while generating approximately 24 million kW-hours of Clean, Renewable Energy each year





LESSON 1: CONSIDER THE EXPERTS







LESSON 1: TAKEAWAYS

- 1. USE YOUR IN-HOUSE EXPERTS**
- 2. RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL ELECTRICAL ENGINEERING ARE NOT ALL THE SAME**
- 3. SILO'S ARE GOOD IN THE RIGHT CONTEXT. SEGREGATE SEPARATE CONTROLS**

LESSON 2: CONSIDER MOISTURE





LESSON 2: TAKEAWAYS

- 1. IT'S NOT ENOUGH TO ASK FOR WATER TIGHT CONDUIT FITTINGS IN A SPEC**
- 2. DURING INSTALLATION, INVEST IN EXPERIENCED ELECTRICAL INSPECTORS**
- 3. INCLUDE PANEL ORIENTATIONS, CONDUIT ENTRIES, AND MOISTURE PREVENTION IN THE DESIGN**



LESSON 3: CONSIDER AUTOMATION







LESSON 3: TAKEAWAYS

1. **ALWAYS HAVE A BACKUP PLAN AND CONSIDER PRIMARY OPERATOR RESPONSIBILITIES**
2. **PERFORM PROPER FIELD TESTING WHEN CRITICAL PROGRAM CHANGES ARE MADE (WHEN POSSIBLE)**
3. **MANAGERS: SHOW GRACE AND KEEP YOUR WORKFORCE MOTIVATED.**

QUESTIONS?

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